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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/678,461	10/03/2003	Michael John Gidley	F3319(C)	3331

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EXAMINER	
STULII, VERA	

ART UNIT	PAPER NUMBER
1794	

NOTIFICATION DATE	DELIVERY MODE
11/16/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentgroupus@unilever.com

Office Action Summary	Application No.	Applicant(s)	
	10/678,461	GIDLEY ET AL.	
	Examiner	**Art Unit**	
	VERA STULII	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 July 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4,5,13,14 and 16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4,5,13,14 and 16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 4-5, 13-14 and 16 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for freezing rate, does not reasonably provide enablement for the rate of cooling. Claims 1, 4-5, 13-14 and 16 are rejected under 35 U.S.C. 112, first paragraph, for the same reasons as stated in the Non-Final Office action mailed 04/02/2009 (pages 2-5).

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 4-5, 13-14 and 16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1, 4-5, 13-14 and 16 are rejected under 35 U.S.C. 112, second paragraph for the same reasons as stated in the Non-Final Office action mailed 04/02/2009 (pages 5-6).

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1, 4-5, 13-14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamane et al (EP 0,815,746 A1) in view of Desrosier et al

(FUNDAMANTALS OF FOOD FREEZING) for the reasons of record as stated in the Office action mailed 04/02/2009 with Jay, Francis et al and OTHER DIFFERENTIAL EQUATIONS cited as evidence as discussed in the Office action mailed 04/02/2009 (pages 7-10).

Claims 1, 4-5, 13-14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamane et al (EP 0,815,746 A1) hereinafter Yamane'746 in view of Yamane (JP 05-161449) hereinafter Yamane'449 for the reasons of record as stated in the Office action mailed 04/02/2009 (pages 10-13).

Terminal Disclaimer

The submission of the terminal disclaimer on 07/02/2009 is noted.

Response to Arguments

Applicant's arguments filed 07/02/2009 have been fully considered but they are not persuasive.

On page 3 of the Reply, Applicants state that:

> Regarding item i): The term "cooling rate" has exactly the same meaning as is widely used in industrial process and understood by those skilled in the art to which the invention pertains, namely a Artisans dealing with the cooling, chilling or freezing of foods. Applicants specifically state on page 2, lines 16-18 that the process of the instant invention can be operated at a cooling rate fully compatible with industrial processes.
> Applicants specifically disclose on page 3, lines 13-17 that they used a Montford Environment Test Chamber which was programmed to provide a linear gradient from +10°C to -30°C over a period of 16 hours.
> Based at least on this disclosure, applicants submit that the meaning of the term "cooling rate" in the context of the present invention would be readily understood by an Artisan to mean: the thermal gradient in time (expressed, for example as °C/min) which a programmable environmental chamber or refrigeration unit applies to the environment (i.e., air) which surrounds its contents (e.g., the fruit) over a specified temperature range or for a specified period of time.

> Thus, the cooling rate is neither the instantaneous rate of temperature decline of an object assumed to be a perfect conductor as set forth by the Examiners equations nor an average rate calculated from endpoint temperatures and time.

In response to this argument, it is noted that Applicants disclose and claim the cooling rate of between 2 °C per hour and 320 °C per hour. Freezing rate is defined as a difference between the initial and the final temperature divided by the freezing time. The freezing rate is expressed in degrees Celsius per hour (see Francis page 1117). The cooling rate is defined as an instantaneous rate of change of the temperature. If an object is allowed to cool, the rate of cooling at any instant is proportional to the difference between the object's temperature and the ambient temperature. In other words, an object cools faster at first, while it is hot, and the rate of cooling slows down as the temperature of the object approaches the ambient temperature. The function that relates the object's temperature to time is a negative exponential function of the form:

$$T(t)=T_a+(T_0-T_a)e^{-kt}$$

T_a is the ambient temperature

(T_0-T_a) is the difference between the object's temperature and the ambient temperature initially at time t=0;

K is a cooling rate constant which governs the rate of cooling;

T is a time of cooling;

It is not clear whether applicant meant an instantaneous rate of cooling (cooling rate) or freezing rate. The newly provided definition of the 'cooling rate" provided on

page 3 of the Reply, that has not been provided previously in the Specification appears to represent “freezing rate” absent any clear and convincing arguments and/or evidence to the contrary.

On pages 3-4 of the Reply, Applicants state that:

> Regarding item ii): Applicants submits that an artisan reading the specification at page 3, lines 13-17 would readily understand how to achieve any desired cooling rate between 2°C/hr and 320°C/hr over a temperature range between 0 °C and -6 °C to -15 °C. The Artisan could at least follow the specification and simply change the cooling program of the programmable environmental chamber to any desired linear thermal gradient between 2°C/hr and 320°C/hr.
> Regarding item iii): Applicants teach in claim 1 two results-effective variables which provide criteria for optimizing the cooling rate in the undercooling zone of the environmental chamber for any given fruit within the broad limits of 2°C/hr and 320°C/hr. Namely, the cooling rate should be chosen such that
> - the fruit is under-cooled to at least 5°C below the freezing point of the fruit, and
> - during under-cooling the cooling rate provides a temperature difference between the surface and core of the fruit which is less than 1.5 °C .
>
> The fruits were cut into 1cm cubes and were frozen from +10 C to -30 C in a Montford freezer at a rate of 2.5 C per hour over 16 hours. During this process, mango was undercooled to -9.8C, kiwi was undercooled to -9.3C, and strawberries were undercooled to -7.4C. The samples where then stored in a freezer at -18 C and mechanical characteristics were measured.

It appears that applicant in fact discloses freezing rate (2.5°C per hour) which is defined as a difference between the initial (+10°C) and the final temperature (-30°C) divided by the freezing time (16 hours). It is further noted that claim 1 recites:

i) cooling fruits to a temperature of 0 C;

ii) under-cooling fruits from 0 C to a temperature between -6 C and -15 C that is at least 5 C below the freezing point of the fruit, at a rate of between 2 C per hour and 320 C per hour

iii) reducing the temperature further until ice formation occurs to produce fruits in a frozen state.

As seen above, the only working example presented by Applicant as "examples 4 to 6" on page 7 of the specification, does not provide three separates steps of "cooling fruits to a temperature of 0 C", and then "under-cooling fruits from 0 C to a temperature between -6 C and -15 C ... at a rate of between 2 C per hour and 320 C per hour", and further "reducing the temperature further until ice formation occurs to produce fruits in a frozen state". The example discloses reduction of temperature from +10 to -30°C over the time period of 16 hours

Therefore, Applicants have not provided sufficient guidance toward the nature of cooling rate as an instantaneous rate of change of the temperature.

On pages 5-6 of the Reply, Applicants state that:

> The Examiner was unclear how frozen fruit have a better flavor and texture than fresh fruit, that it was not clear if frozen fruits produced by the recited method retain flavor and structure that are rated higher when compared to some other products.
> Firstly, claim 1 does not recite a frozen fruit which has a better flavor and structure than fresh fruit. The preamble of claim 1 recites a process producing frozen fruits which when eaten frozen better retain the flavor and structure of unfrozen fruit, i.e., the flavor and structure of frozen fruits made by the instant process are closer to fresh fruits than fruits which are frozen, for example, by the conventional blast freezer process.
> Secondly, the flavor and textural properties of frozen fruits prepared by conventional blast freezing (comparative examples 1-3) and by the process recited in claim 1 were evaluated by sensory testing and mechanical assessment. The results are summarized on page 8.

In response to this argument, it is noted that claim 1 currently recites "Process for the production of frozen fruits which when eaten frozen better retain the flavor and structure of unfrozen fruit". Therefore, Applicants' arguments are not persuasive. The phrase "the flavor and structure of frozen fruits made by the instant process are closer to fresh fruits than fruits which are frozen, for example, by the conventional blast freezer process" is confusing and does not clarify the issue of indefiniteness. Applicants are, in fact, comparing the structure of frozen fruit to fresh fruit. Hence, the claim is rendered indefinite for the following reasons:

-it is not clear how frozen fruit have a better flavor and structure than fresh fruit,

-it is not clear if frozen fruit produced by the recited method retain the flavor and structure that are rated higher when compared to some other product, or

-there is some other interpretation.

On page 9 of the Reply, Applicants state that:

> Applicants' limitations on cooling rate based on temperature differential between surface and core of less than 1.5°C is neither taught or suggested by the combination of Yamane, Desrosier and Jay. Consequently, the references can not render applicants' claims obvious under §103(a) at least because the references do not teach or suggest this limitation either explicitly or implicitly.

Regarding the temperature difference between the surface and the core, Yamane et al disclose that "Furthermore, in the present invention, it is possible to preserve a perishable food or the like, especially one composed of an animal or vegetable material, with only the inner cells thereof in a non-frozen state. The above-mentioned slow cooling treatment, which is carried out at a gradual cooling rate of 0.01

to 0.5 °C/hour, can be combined with a rapid freezing treatment, in which the food or the like is frozen at -18 °C or lower, for example, from a supercooled state below the freezing point, which makes it easier for the extracellular fluid to freeze, while making it more difficult for the intracellular fluid to freeze, so that it is possible to freeze the outer cells of the food or the like and to preserve the inner cells in a non-frozen state. When a method such as this is employed in the present invention, it is possible to maintain a perishable food, especially fruit, an animal product, seafood, or the like, at a high level of freshness and quality" (p. 9 lines 1-8). Since Yamane et al also discloses the combination of rapid cooling with slow cooling and that any method may be employed to subject the food or the like to a cooling treatment in a temperature zone in the non-freezing region below the freezing point, and Desrosier et al discloses advantages of quick cooling/freezing techniques, it would have been obvious to modify disclosure of Yamane et al and to vary cooling rates in order to achieve high level of freshness and quality as disclosed by Yamane et al. One of ordinary skill in the art would have been motivated to do so in order to obtain a superior quality product as taught by Desrosier et al. It is noted that such cooling rate is in the claimed range as evidenced by Jay. As evidenced by Francis et al (Wiley Encyclopedia of Food Science and Technology) "[t]he freezing rate may be evaluated by the speed of movement of the ice (in centimeters per hour) through a product. This speed is faster near the surface and slower toward the center" (p. 1117). Thus, employing the method steps as taught by Yamane et al and cooling rate as taught by Desrosier et al. for the reasons stated above, would inherently

lead to a temperature difference between the surface and core and fracture force as a measurement of mechanical properties of food in relation to texture as claimed.

On page 10 of the Reply, Applicants state that:

> Applicants' respectfully submit that the Examiner has picked and chosen elements from Yamane, Desrosier and Jay that supports an obviousness argument while ignoring key parts of the references which are intrinsically incompatible and which would have discouraged a person of ordinary skill in the art from making the modification which the Examiner has stated a being obvious.

Examiner respectfully disagrees for the reasons as stated above and n the Ono-Final Office action mailed 04/02/2009.

On page 10 of the Reply, Applicants state that:

> Furthermore, the Examiner has chosen to ignore the comparative examples provided by applicants where essentially the modification suggested by the Examiner was carried out (cooling in the under-cooling region in a blast freezer to -30°C in 1 hour) and found to produce an inferior product relative to the instant process.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., cooling in the under-cooling region in a blast freezer to -30°C in 1 hour) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

On page 10 of the Reply, Applicants state that:

> Thus, the process taught in Yamane '449 does not involve the actual freezing of fruits, i.e., the fruits are heated before the supercooling break temperature is reached, i.e., before ice nucleation and growth.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Yamane'449 discloses a method of cooling fruit below its freezing point to preserve the freshness of the fruit for a long period of time (Abstract). Yamane'449 discloses

i) cooling fruits to a temperature of 0 °C (which is 1 to 2°C higher than the freezing point),

ii) under-cooling fruits from 0 °C to a temperature below the freezing point at a rate of 5°C/per hour to 0.5 C/per 24 hours (Abstract).

Yamane'449 discloses that the cooling fruit at a disclosed cooling rate slows down the metabolic processes in fruit and permits maintenance of the freshness of the cooled fruit. Yamane'449 is relied upon as a teaching of the recited cooling/freezing rate.

On page 12 of the Reply, Applicants state that:

> Both the Yamane references are silent about the criteria that the cooling rate in the undercooling zone is selected such that the temperature difference between the surface and core of the fruit is less than 1.5°C.

As stated in the Non-Final Office action mailed 04/02/2009, regarding the temperature difference between the core and the surface of the fruit and the fracture force of the fruit in the frozen state, it is noted that although the references do not specifically disclose every possible quantification or characteristic of its product, such as

the temperature difference between the core and the surface of the fruit and fracture force of the fruit in the frozen state, these characteristics would have been expected to be in the claimed range absent any clear and convincing evidence and/or arguments to the contrary. The combination of references disclose the same starting materials and methods as instantly (both broadly and more specifically) claimed, and thus one of ordinary skill in the art would recognize that the temperature difference between the core and the surface of the fruit and fracture force of the fruit in the frozen state, among many other characteristics of the product obtained by referenced method, would have been an inherent result of the process disclosed therein. The Patent Office does not possess the facilities to make and test the referenced method and product obtain by such method, and as reasonable reading of the teachings of the references has been applied to establish the case of obviousness, the burden thus shifts to applicant to demonstrate otherwise.

On page 13 of the Reply, Applicants state that:

> Both Yamane references are directed to a method for preserving perishable foods, including slowing down metabolic rate and have the same inventor.
> Yamane '449 predates Yamane '746.
> Yamane '449 is in point of fact not directed to freezing foods but rather preservation without freezing.
> Although Yamane '449 discloses a cooling rate of-5°C/1 hour to -0.5°C/24 hour in the abtract, all the examples taught by Yamane '449 employ a cooling rate of -0.5°C/24hr or -0.02°C /hr which is precisely within the limits for the rate of cooling taught as essential by Yamane '746, i.e., 0.01-0.5 C°/hour.
> Given the above facts scenario, applicants submit that a person of ordinary skill in the art reading both references in their entirety would not have been motivated to replace the cooling range taught by Yamane '746 by the cooling rate range disclosed by Yamane '449 and would have actually been dissuaded from doing so.

Examiner respectfully disagrees. As stated in the Non-Final Office action mailed 04/02/2009, Yamane'746 discloses a process for the production of frozen fruits which makes possible to maintain fruit in their high state of freshness (page 3 lines 9-12), said fruits characterized by a surface and a core, said process comprising the steps of

i) cooling fruits to a temperature of 0 °C,

ii) under-cooling fruits from 0 °C to a temperature between -2.2 C and -15 C that is at least 5 C below the freezing point of the fruit,

iii) reducing the temperature further until ice formation occurs to produce fruits in a frozen state (page 13 Example 10).

Further in this regard, Yamane et al also disclose that the slow cooling can be combined with a rapid freezing treatment, in which the food is frozen at -18°C or lower, for example, from supercooled state below the freezing point (p. 9 lines 1-7). Yamane et al also disclose freezing points and regions below the freezing point from -1°C to -18°C (pp. 6-7; p. 9 lines 1-7). Thus Yamane et al discloses a process for production of frozen fruits comprising the steps of cooling fruits to 0°C (temperature that is close to a freezing point), under-cooling fruits from 0°C to a temperature up to -18°C, and then reducing the temperature further to produce the fruit in a frozen state. Yamane et al also disclose freezing points of fruits from -0.9°C to -2.4°C and regions below the freezing point from -1°C to -18°C (pp. 6-7; p. 9 lines 1-7).

In regard to claim 1, Yamane'746 does not disclose the cooling rate during the under-cooling as recited.

Yamane'449 discloses a method of cooling fruit below its freezing point to preserve the freshness of the fruit for a long period of time (Abstract). Yamane'449 discloses

i) cooling fruits to a temperature of 0 °C (which is 1 to 2°C higher than the freezing point),

ii) under-cooling fruits from 0 °C to a temperature below the freezing point at a rate of 5°C/per hour to 0.5 C/per 24 hours (Abstract).

Yamane'449 discloses that the cooling fruit at a disclosed cooling rate slows down the metabolic processes in fruit and permits maintenance of the freshness of the cooled fruit.

Since both Yamane'746 and Yamane'449 are concerned with preserving fruit at their fresh state by cooling fruits to a temperature of 0 °C and then under-cooling fruits from 0 °C to a temperature below the freezing point, and Yamane'449 teaches cooling fruit at a disclosed cooling rate to slow down the metabolic processes in fruit and to therefore maintain the freshness of the cooled fruit, one of ordinary skill in the art would have been motivated to modify Yamane'746, and to employ the cooling rate as disclosed by Yamane'449 for the benefits taught by Yamane'449.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to VERA STULII whose telephone number is (571)272-3221. The examiner can normally be reached on 7:00 am-3:30 pm, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Keith Hendricks can be reached on (571) 272-1401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Steve Weinstein/
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/Vera Stulii/
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